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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/066,720	02/06/2002	Tuyu Xie	755-234/DPC	4053

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EXAMINER

TSANG FOSTER, SUSY N

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 06/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)	
10/066,720	XIE ET AL.	
Examiner	Art Unit	
Susy N Tsang-Foster	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133)
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
 Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This Office Action is responsive to the amendment filed on 3/5/2004. Claims 1, 10, and 20 have been amended. Claims 1-20 are pending. Previous art rejections based on WO 01/52339 A are withdrawn in view of applicant's arguments and translation of the reference. Claims 1-20 are finally rejected for reasons necessitated by applicant's amendment.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 1, the limitation "connecting an external circuit to the fuel cell thereby ceasing to operate the fuel cell in the open circuit state before the intermediate temperature equals the desired temperature" does not appear to be in the original disclosure.

Claims depending from claims rejected under 35 USC 112, first paragraph are also rejected for the same.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is noted that the limitations "desired temperature" and "initial temperature" were not recited in the body of any of the original claims and therefore were not addressed by the Examiner in the previous office action. Limitations that appear in the preamble and not in the body of the claims are not given patentable weight.

In claim 1, it is unclear to the Examiner what the initial temperature, intermediate temperature, and desired temperature are as recited in the body of the claims.

Furthermore, in claim 1, the limitation "before the intermediate temperature equals the desired temperature" is indefinite because it is unclear how the intermediate temperature can become the desired temperature if the intermediate temperature is between the initial temperature and the desired temperature as recited in step (d) of the claim.

Claims depending from claims rejected under 35 USC 112, second paragraph are also rejected for the same.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1- 5, 7-15, and 17-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Colbow et al. (US 2003/0003336 A1).

Colbow et al. disclose a method of starting a solid polymer electrolyte fuel cell wherein the temperature of the fuel cell is increased when the temperature of the fuel cell is below a preferred operating temperature range by providing a fuel stream containing methanol to the fuel cell anode and facilitating methanol crossover and combustion wherein the methanol concentration or pressure can be adjusted in response to the measured parameter indicative of the fuel cell temperature (see abstract, paragraph 1 and Figure 1). If the pressure of the methanol is adjusted, the flow rate of the methanol would also be adjusted.

Specifically, Colbow et al. disclose a plurality of fuel cells in a fuel cell stack wherein each fuel cell comprises an anode comprising an anode flow field plate, an anode diffusion layer,

and an anode catalyst layer, a cathode comprising a cathode flow field plate, a cathode diffusion layer and a cathode catalyst layer, and a proton conductive membrane; operating the plurality of fuel cells at an open circuit state, feeding at a fuel feed rate an aqueous methanol solution to the anode and feeding at an oxidant feed rate an oxidant to the cathode; allowing the methanol in the methanol solution to diffuse through the proton conductive membrane from the anode to the cathode and oxidizing the fuel at the cathode to generate heat thereby heating the fuel cell (paragraphs 2-5, 9, 22, 31-33, 53, and Figure 3).

After startup, the normal operating methanol concentration is less than the starting methanol concentration (paragraphs 33 and 47). Calculations show that 40 wt% of methanol is approximately 1.3 M and 25 wt% of methanol is approximately 0.81 M. The starting methanol concentration is about 1.5 M or higher (paragraph 33) which is greater than 40 wt%. In environments where the ambient temperature is below the operating temperature of the fuel cell, in particular below zero degrees Celsius, it is desirable to employ a methanol concentration of about 10 M or higher so that the freezing point of the fuel stream is sufficiently lowered where employing methanol concentrations greater than about 8 M at start-up, a freezing point of -25 degrees Celsius or lower can be obtained (see paragraph 44).

The fuel supply system may receive a fuel outlet stream from the fuel cell stack and recirculate a portion of the fuel outlet stream into the fuel inlet stream without heating the recycled portion such that the fuel supply system does not need a heating element to heat the fuel inlet stream outside of the fuel cell stack (see paragraph 38). Since the temperature of the fuel cell can be controlled during startup by varying the concentration of the methanol solution (see paragraphs 1 and 53, and abstract) and the fuel outlet stream is recirculated, the temperature of

the fuel solution fed to the anode can be controlled. During recirculation of the fuel outlet stream, the liquid water and methanol are recirculated back into the gas/separator 3 which also functions as a fuel reservoir (see Figure 1 and paragraph 45).

During normal operation of the fuel cell where the fuel cell is connected to an external circuit, the normal operating methanol concentration can be from about 0.5 M to about 1.5 M (see paragraph 33 of reference). The concentration of 0.5 M methanol solution is approximately 1.6 wt%.

The reference also discloses that methanol can be supplied to both oxidant and fuel flow fields and combusted therein until the temperature of the fuel cell has been raised above the freezing point of water (see paragraph 43). The fuel supplied to the fuel flow field would inherently cross over and is combusted on the cathode catalyst (see paragraph 42). Once the temperature is above the freezing point of water (the intermediate temperature) which is below the desired normal operating temperature of the fuel cell, a load (an external circuit) can be applied, thus increasing the heat (therefore the temperature) being generated within the fuel cell (see paragraph 43). Adding heat to the fuel cell after connecting the external circuit would inherently increase the temperature of the fuel cell to the desired temperature.

Response to Arguments

8. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

9. Claims 6 and 16 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

The closest prior art of record, Colbow et al., does not disclose, teach, or suggest the distinguishing step of varying the oxidant feed rate so as to control the heating of the fuel cell.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

12. Any inquiry concerning this communication or earlier communications should be directed to examiner Susy Tsang-Foster, Ph.D. whose telephone number is (571) 272-1293. The examiner can normally be reached on Monday through Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at (571) 272-1292.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

st/ *Susy Tsang-Foster*

Susy Tsang-Foster
Primary Examiner
Art Unit 1745